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AB - J78039374 Method for producing a Ni plated steel sheet to be formed into a battery casing comprises forming a Ni layer on one or both surfaces of a cold rolled steel sheet by electroplating, and annealing the Ni plated steel sheet at 840-900 degrees C in a H2+N2 gas stream.
- Method prevents formation of cracks in the Ni coating during deep drawing or pressing of the Ni plated steel sheet.
IW - NICKEL ELECTROPLATING STEEL SHEET PRODUCE MANUFACTURE BATTERY CASING SILVER MERCURY CELL
IKW - NICKEL ELECTROPLATING STEEL SHEET PRODUCE MANUFACTURE BATTERY CASING SILVER MERCURY CELL
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PAW - (SUWA) SUWA SEIKOSHA KK
TI - Nickel-electroplated steel sheet prodn. - for mfr. of battery casings for silver or mercury cells

(7)

MACHINE-ASSISTED TRANSLATION (MAT):

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昭和 53 年(1978)10 月 20 日

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1
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(54)【銀電池または水銀電池容器の製造方法】

(21)【特願】
昭 45-127222

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【図面の簡単な説明】
第 1 図は焼鈍しない場合のメッキ割れを示す図、第 2 図は一般的な焼鈍を施した場合の図、第 3 図、第 4 図は本発明による焼鈍処理を施した場合の効果を示す図である。

【発明の詳細な説明】
本発明は銀電池及び水銀電池

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(54)[Manufacturing method of a silver battery or a mercury battery container]

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Showa 45(1970) December 30th

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[BRIEF EXPLANATION OF DRAWINGS]
Figure 1 is a figure showing the plating crack in the case of not performing an anneal, and Figure 2 is a figure at the time of giving a general anneal, and Figure 3 and figure 4 are figures showing the effect at the time of performing the anneal process by this invention.

[DETAILED DESCRIPTION OF INVENTION]
This invention relates to below. The anneal processing method for crack prevention of the

の容器等の材料として用いられている冷間圧延鋼板等のプレス絞り材に電気ニッケルメッキを施した後、これをプレス絞り加工を行なう場合のメッキ層の割れ防止の為の焼鈍処理方法に関するものである。

一般にあらかじめメッキ処理を施した材料をプレス絞り加工する場合メッキの剥離や割れが生じるのでメッキの種類や厚みを限定したり、必要な場合には焼鈍処理が行なわれることは知られているが焼鈍処理によるメッキ面の光沢度の低下、微視的メッキ割れの完全防止及び処理能率の問題を完全解決することは困難であった。

本発明の目的はこの点に着目しメッキ面の光沢度を低下させずにプレス絞り加工によるメッキ割れを完全防止することのできる能率的焼鈍処理方法を提供するものである。

以下本発明による処理方法について詳細に説明する。

plated layer in the case of performing a drawing process, after giving electric nickel plating to drawing materials, such as the cold rolled steel plate used for material, such as the receptacle of a silver battery and a mercury battery

Since exfoliation and the crack of plating arise when performing the drawing process of the material which processed plating beforehand generally, the kind and the thickness of plating are limited.

Moreover, although it was known that an anneal process will be performed when required, it was difficult to solve completely full prevention of a reduction of the glossiness of the plating surface by anneal process, and a microscopic plating crack, and the problem of process efficiency.

The objective of this invention provides the efficient anneal processing method which can carry out full prevention of the plating crack by the drawing processing, without making the glossiness of a plating surface reduce paying attention to this point.

The processing method by this invention is explained in detail below.

プレスによる絞り加工を行なう製品は絞り加工後にメッキ処理をするのが普通であるが、銀電池及び水銀電池の容器の如く裏表夫々銅メッキ、電気ニッケルメッキと異なったメッキ処理を施す必要のあるものはプレス絞り加工前にあらかじめ材料にメッキ処理をしておいた方が能率的であることは明らかである。

しかしこの場合問題となるのが上述の如き絞り加工の際のメッキの剥離、割れの現象である。メッキ割れは周知の如くメッキ

It is common to process plating after a drawing process for the product in which the drawing process by the press is performed.

However, it is clear to that which has the need of giving the plating process different from the copper coating and electric nickel plating in the both of right and reverse side like the receptacle of a silver battery and a mercury battery that it is more efficient to process plating into material beforehand before a drawing process.

However it is the phenomenon of exfoliation and the crack of the plating in the case of the above drawing process to become a problem in this case.

As is well-known, a plating crack becomes the cause of exfoliation of plating. In above, it is not desirable on a rust proof.

の剥離の原因となると共に、防錆上好ましくない。従って電気ニッケルメッキの厚みは必要最小限に押えると共にメッキの種類も通常用いられるワット浴よりも電着応力の低いスルファミン酸ニッケルメッキ浴を用いたり又硬度を減少させる為光沢剤の添加量を減らしたりすることが行なわれる。

しかし第1図に示すように上記のようなメッキ的な手段のみでは絞り加工によるメッキ層の割れを完全防止することは出来ない。従って一般に上述の如き配慮が行なわれた上、更に焼鈍処理が施されるが電気ニッケルメッキ面の光沢を減少させずにしかも能率的に処理して目的を達することは極めて困難である。

第2図は真空焼鈍炉を使用して真空度10-3mmHg温度700℃で10分間加熱後徐冷したものでメッキ層の割れは依然認められ、焼鈍がまだ不完全であることを示している。

更に真空焼鈍炉で温度を700℃にして20分間加熱したもの又800℃で10分間加熱したものはメッキ面に表面酸化によるくもりが生じたり又は全く光沢が失なわれてしまうし、しかもこれらの条件によっても割れを完全に防止することは出来ない。

これに対して窒素ガス及び水素ガスによる雰囲気連続焼鈍炉を使用し温度を840℃-900℃に保ち1～2分間にわたり連続焼鈍した場合を第3図に示すがメ

Therefore the thickness of electric nickel plating is pressed down to necessary minimum. Furthermore, the sulfamic acid nickel plating bath with a stress in electrodeposits lower than the usual Watts bath used is used. Moreover in order to make hardness reduce, reducing the additional amount of a glossing agent is performed.

However as shown in figure 1, full prevention of the crack of the plated layer by the drawing process cannot be performed only with above plating-means.

Therefore after generally above consideration is performed, although an anneal process is performed further, it is very difficult to process efficiently and to attain the objective, without making the glossiness of an electric nickel plating surface reduce.

Figure 2 is what was slow-cooled after the heating for 10 minutes at the degree of vacuum 10-3 mmHg and temperature of 700 degree C using the vacuum annealing reactor, the crack of a plated layer is still observed, and it is shown that an anneal is still imperfect.

Furthermore the fogging by surface oxidation will produce in a plating surface, as for what was heated for 20 minutes at 700 degree C or heated for 10 minutes at 800 degree C in the vacuum annealing reactor, or it will completely lose a glossiness. And a crack cannot be completely prevented even by these conditions.

On the other hand the case where kept temperature at 840 degree C -900 degree C using the atmosphere continuous annealing furnace by nitrogen gas and hydrogen gas, and a continuous annealing is performed through for

ッキ層の割れは完全に消え、しかも焼鈍によるくもりも発生しない。

この場合は第4図に示す如くワット浴の場合でもメッキ割れは生ぜず又光沢剤等の添加物の量にもあまり影響されない。なお、炉内温度を840℃以下にした場合は焼鈍が完全に行われず、プレス絞り加工の時点で割れが発生する。

又、900℃以上に上げた場合はニッケムの表面にくもりが発生して外観的によい製品ができない。

又、焼鈍時間を1分以下にした場合、焼鈍が完全に行われず、プレス絞り加工の時点で割れが発生する。

又、2分以上の時間をかけて焼鈍した場合はニッケルの表面にくもりが発生して外観的によい製品ができない。即ちプレス絞り加工によるメッキ割れの現象はメッキ処理による要因よりも、焼鈍処理による要因が大きくきいていることがわかる。従って、真空炉を使用することは甚だ非能率であるがこのような連続焼鈍炉を使用した場合は短尺材であっても連続したフープ材であっても能率は極めてよく、又メッキ処理条件に余り影響されずに簡単に電気ニッケルメッキ被覆材の焼鈍処理が行なえる上、プレス絞り加工に対する効果は極めて大きい。

(57)【特許請求の範囲】

1 銀電池または水銀電池の容器用材料として用いられる冷間圧延鋼板の材料の片面または両面

1- 2 minutes is shown in Figure 3. The crack of a plated layer disappears completely and, moreover, does not generate the fogging by the anneal, either.

In this case as shown in figure 4, a plating crack is not generated in the case of a Watts bath, either. Moreover it is seldom influenced by the quantity of additives, such as a glossing agent.

In addition, when temperature in the furnace is made into 840 degree C or less, an anneal is not performed completely but a crack generates at the time of a drawing processing.

Moreover, when raising to 900 degree C or more, the fogging generates on the surface of a nickel, and the good product in terms of an outward appearance is not made.

Moreover, when an anneal time is carried out in 1 or less minute, an anneal is not performed completely but a crack generates at the time of a drawing processing.

Moreover, when an anneal is performed for 2 minutes or more, the fogging generates on the surface of a nickel, and the good product in terms of an outward appearance is not made.

That is, it turns out that the phenomenon of the plating crack by the drawing process is based on the factor by anneal process rather than the factor by plating process.

Therefore, although it was very inefficient to have used a vacuum reactor, when using such a continuous annealing furnace, efficiency is very good even when it is the hoop which continued even when it was the short material. Moreover an anneal process of an electric nickel plating covering material can be simply carried out without being influenced by the conditions of plating process. Moreover, the effect with respect to a drawing process is very large.

(57)[CLAIMS]

After coating electric nickel plating beforehand before drawing process to one side or both sides of material of a cold rolled steel plate

に絞り加工前にあらかじめ電気ニッケルメッキを被覆した後で、窒素ガスおよび水素ガスの雰囲気から成る焼鈍炉を使用し、炉内温度を 840～900℃に保ち、1～2 分間焼鈍することを特徴とする銀電池または水銀電池容器の製造方法。

(56)【引用文献】
特公昭 44-14572

which are used for the receptacle material of a silver battery or a mercury battery, the annealing furnace which consists of the atmosphere of nitrogen gas and hydrogen gas is used.

The anneal is performed for 1- 2 minutes maintaining the temperature in the furnace to 840-900 degree C.

The manufacturing method of a silver battery or mercury battery receptacle characterized by the above-mentioned.

(56)[Reference literature]
Japanese Patent Publication No. 44-14572

第1図

第2図

第3図

第4図

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